Case Report

International Journal of Dental and Health Sciences
Volume 02, Issue 04

IDIOPATHIC UNILATERAL MASSETER MUSCLE HYPERTROPHY: A CASE REPORT AND REVIEW

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ABSTRACT:

Masseter muscle hypertrophy also called as Benign Massetric hypertrophy (BMH) or Idiopathic Massetric Muscle Hypertrophy (IMMH) is a rare condition of unknown cause which is important in the differential diagnosis of head and neck masses, located in the cheek. It can occur unilaterally or bilaterally. Most patients consult a physician for esthetic correction of the resultant facial asymmetry. Symptoms such as trismus, protrusion, and bruxism may also occur. Associated pain may be present very rarely. Several treatment options are reported for masseter hypertrophy, which range from simple pharmacotherapy to more invasive surgical reduction. The purpose of this article is to report a case of masseter hypertrophy in a 30 year old female, which was surgically treated by debulking of masseter muscle and mandible ramal osteotomy.

Key Words: Masseter, Idiopathic, Debulking

INTRODUCTION:

Masseter muscle is essential for adequate mastication and is located laterally to the mandibular ramus, and thus plays an important role in facial esthetics [1]. Masseter is a thick quadrate muscle composed of two layers arising from the inferior border and medial surface of the zygomatic arch and inserts broadly onto the lateral surface of the ramus of the mandible and coronoid process [2, 3].

Masseteric hypertrophy (MH) is a condition characterized by asymptomatic enlargement of one or both masseter muscles [4].In majority of the cases, the etiology is idiopathic. Idiopathic masseter muscle hypertrophy was first described by Legg in 1880 .A hypertrophied muscle will alter facial lines, leading to discomfort and negative cosmetic impacts for many patients. Sometimes masseter hypertrophy is associated with pain, which may be intermittent and confused with parotid gland swellings [2].It can be unilateral or bilateral. Unilateral occurrence can be seen when patients chew or clench.

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Primarily on one side. The highest incidence for this condition is in the second and third decades of life, with no gender predilection.

The traditional method of treatment for MH is the surgical partial excision of masseter muscle under general anaesthesia. Botulinum toxin type-A injection is reported to be a safe and effective treatment modality for MH[4].This article focuses on a to report a case of masseter hypertrophy in a 30 year old female, which was surgically treated by debulking of masseter muscle and mandible ramal osteotomy.

CASE DETAIL:

A 18 year old female reported to our department with chief complaint of occasional pain and facial swelling with respect to the right side of her face. Her facial profile was normal until she noticed mild swelling 2 years back which gradually increased in size and was occasionally accompanied by pain. She gave no history of trauma or any systemic disease. She gave a history of alcohol intake on rare occasions and consumption of betel nut once a month during family functions .The consumption of betel nut is a custom practiced in her community widely. She also had a habit of keeping pen in her teeth during studying hours.

The swelling became more prominent and firm when she clenched her teeth .Physical examination also revealed that the patient had unilateral masseter muscle bulging, with a prominent mandibular angle at the lower border.(Figure.1) The submandibular lymph nodes were palpable on both sides however they were mobile and non-tender.There was no associated pain or clicking noise in the temporomandibular joint.

On intra oral examination it was found that her occlusion was normal. There was a shift in the midline of lower dentition w.r.t to the upper dentition. Mouth opening was normal Orthopantomograph and CT scan of the patient showed mild ramus hyperplasia with mandibular angle prominence on the right side.(Figure.2,3,4)

Bone scan done showed normal bone scan study with no significant tracer uptake in right condyle or mandible.

Data from clinical and radiographic examination led to the diagnosis of unilateral masseter muscle hypertrophy. Nonsurgical options such as botox therapy and the advantages and disadvantages of both surgery and botox treatment were discussed with the patient.

The patient opted for surgical option. The surgery was done under general anesthesia with nasotracheal intubation via an extra oral approach using Risdon's incision (Figure.5). The marginal mandibular nerve was identified and protected.

To decide on the amount of osteotomy to be performed a novel method was decided preoperatively. A horizontal line was drawn passing through the center of sigmoid notch and a vertical line was

drawn from this point joining the mandibular ramal angle region It was found that on the left side the vertical height was 5.3 cm and on the left side it was 5.8 cm indicating a .5 cm excess. Similarly the left side ramus was divided into 4 equal quadrants and horizontal distance till the posterior border of the ramus was calculated. These reading were transferred on the right side of ramus after divding a 5.3 cm ramus into 4 equal quadrants. The excess of ramus below the attachment of lateral pterygoid muscle which was to be removed during surgery has been shaded. (Figure.4,6)

Debulking of the masseter muscles long with bony osteotomy of mandibular ramus-angle region was done. (Figure 7,8) A vertical internal muscle band equivalent to two third of the thickness of the muscle was resected (Figure.9). After the muscle was resected, the remaining external third was sutured to its site of origin onto the muscle stump inserted in the mandibular basilar. Sharp margins were trimmed with a bone file.

Closure was done in two layers using (vicryl 3-0) for subcuticular sutures. Healing was uneventful after 6 months.(Figure.10)

DISCUSSION:

Idiopathic masseter muscle hypertrophy was first described by Legg in 1880, reporting on the case of a 10-year-old girl with concurrent idiopathic temporalis muscle hypertrophy[5]. IMMH is considered to be a rare disease, in spite of the growing esthetic concern manifested around it by patients [6]. This origin of this condition is still unknown [6-11]. People of Asian descent are more frequently involved[12] .Some authors have correlated idiopathic masseter muscle hypertrophy to a variety of conditions, such as defective teeth, dysfunctional mastication, gum chewing, TMJ disorders, teeth grinding, bruxism, and clenching teeth during sleep[6]. Therefore, anyone with the above mentioned conditions may develop unilateral or bilateral masseter muscle hypertrophy. People with psychological disorders or emotional disturbances that impact proprioception and the ability to keep the tone of the masseter muscle are at a higher risk of evolving to IMMH. According to Teixeira, there are two types of masseter muscle hypertrophy: congenital or familial and acquired due to functional hypertrophy [6].

Idiopathic masseter muscle hypertrophy must be accurately diagnosed, as it may be mistaken for other diseases. Among them are unilateral compensatory hypertrophy (due to hypotrophy or hypoplasia in the contralateral side), masseter tumor, salivary gland disease, parotid tumor, parotid inflammatory disease, and masseter muscle intrinsic myopathy [6,7,9].

Diagnosis can be produced from clinical examination, directed interview, panoramic x-ray[6-11], and muscle palpation. This last diagnostic test consists of palpating the muscle with the fingers while the patient clenches his/her teeth so the muscle is more prominent during contraction. With the muscle relaxed and the patient's mouth slightly open,

extraoral palpation with both hands will pinpoint the intramuscular location of the hypertrophy. Under relaxation, the jaw angle may reveal irregularities that on the x-ray image may appear to be a bone increase [6]. According to Seltzer and Wang (1987), CT and MRI scans produce excellent images for the diagnosis of various masseter muscle conditions [13].

Most patients only complain of cosmetic problems, as an increased masseter introduces facial asymmetry, also called 'square' face [6-11]. Some individuals complain of pain, headache, muscle stress, trismus, and intermittent masticatory claudication [6-9].

There are various treatment modalities for the management of masseter hypertrophy. This can be categorized into nonsurgical and surgical. Management of the idiopathic masseter hypertrophy is based on psychological counseling, use of mouth guards, -muscle relaxant, and anxiolytic drugs, analgesics, physical therapy, dental restorations, and occlusal adjustments to correct premature contacts. A good result can be achieved in the patients with mild hypertrophy but there is no reliable report on the literature on the success rates of isolated clinical therapy. Injection of botulinum toxin type A into the masseter muscle is generally considered a less invasive modality and has been advocated for cosmetic sculpting of the lower face, first introduced by Smyth, Moore, and Wood in 1994 and considered a less invasive modality for the treatment of muscle hypertrophy[14]. Local injection of very small doses of the toxin into a muscle produces local paralysis and therefore, individual muscles can be selectively weakened and atrophy of the muscle occurs.

Perhaps the biggest disadvantage of botulinum toxin therapy is that the treatment effect wears away and reverts to the original condition in 6 months [15]. Ham JW at all (2009) used radiofrequency coagulation is the procedure by which an electric current is used as an alternative energy source which cause ionic agitation, leads to tissue coagulation through frictional (60-800c) to denature the proteins. This ultimately produces a focal necrosis of the hypertrophied masseter muscle without any side effects [16].The traditional method of treatment for masseter hypertrophy is the surgical partial excision of masseter muscle under general anesthesia.

The surgical treatment is based on intra- and extraoral approaches. Both techniques revolve around the removal of excessive muscle fibers from the inner third of the masseter vertical muscle fibers. Reduction osteoplasty may be performed in cases of bony hyperplasia of the mandibular angle [12]. The remaining external bundle of the masseter should be attached to the mandibular periosteum to allow for adequate functional recovery. The choice between intra- and extraoral approaches is not related to cosmetic or functional outcomes or to the risk of introducing vascular and nerve injury, but to the skill and experience of the surgeon in performing surgery using either of the

approaches. The extraoral approach was widely indicated, because it offered better visualization. The procedure is carried out through a submandibular incision, Risdon. Unlike surgical excision of muscle tissue that reduces the actual number of muscle cells, botulinum toxin type A only reduces muscle volume temporarily. Surgical treatment was proposed for the first time by Gurney in 1947[17]. The procedure consists of a submandibular incision and the removal of three fourth to two third of all muscle tissue available from the muscle upper aponeurosis to the lower mandibular border. Removal of the masseter muscle insertion by means of a triangular incision was done by Martensson in a patient with history of bruxism and unilateral masseter muscle hypertrophy [18]. Beckers in 1977 surgically treated 17 patients using the intraoral approach in which internal muscle band was removed from the hypertrophied masseter. An internal muscle band was removed from the hypertrophied masseter from the upper insertion in the zygomatic arc to the lower insertion in the mandibular angle, thus avoiding the production of a visible scar on the patient's face and reducing the possibility of injuring branches of the facial nerve [19]. Another surgical technique is, in which the bony protuberance is removed the mandibular angle without removing any parts of the masseter muscle [20]. Complications from surgical excision of masseter include hematoma formation, facial nerve paralysis, infection, mouth opening limitation and sequelae from general anesthesia [21].

CONCLUSION:

IMMH is a benign, asymptomatic enlargement of one or both masseter muscles of obscure etiology. Although the diagnosis is eminently clinical, complementary exams may aid in the differential diagnosis against other benign and malignant soft tissue lesions before a surgical treatment is planned, as most of the malignant skeletal muscle lesions and malignant parotid gland lesions may mimic masseter hypertrophy. The surgical treatment chosen is subjected to the operating surgeons skills and expertise.

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FIGURES:

Figure.1 Pre operative clinical photograph of patient showing right side masseter bulk.

Figure.2 3D CT of the same patient

Figure.3 3D CT right side showing bony spurs over lower ramal region and ramal hyperplasia

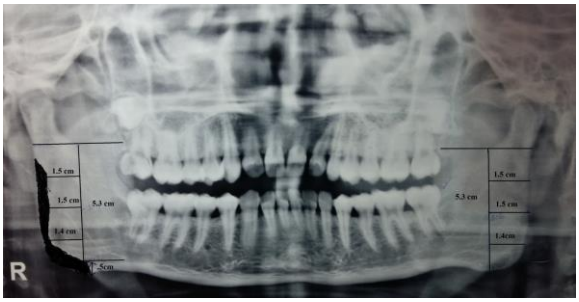

Figure 4: Pre operative OPG with tracing to determine extent of osteotomy required

Figure.5 Risdons incision

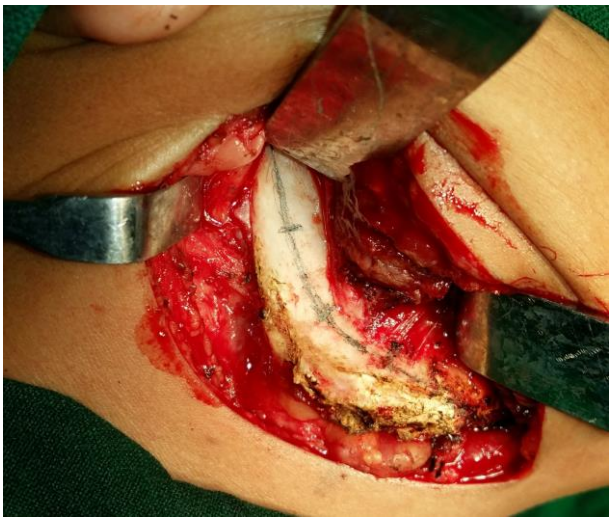

Figure .6 Intra-operative transfer of marking for osteotomy

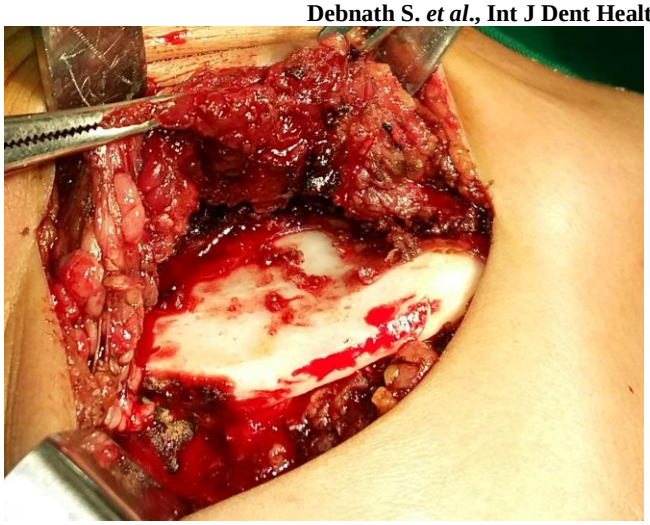

Figure.7: Hypertrophied masseter muscle

Figure.8: Excised ramal bone specimen

Figure .9: Excised masseter muscle specimen

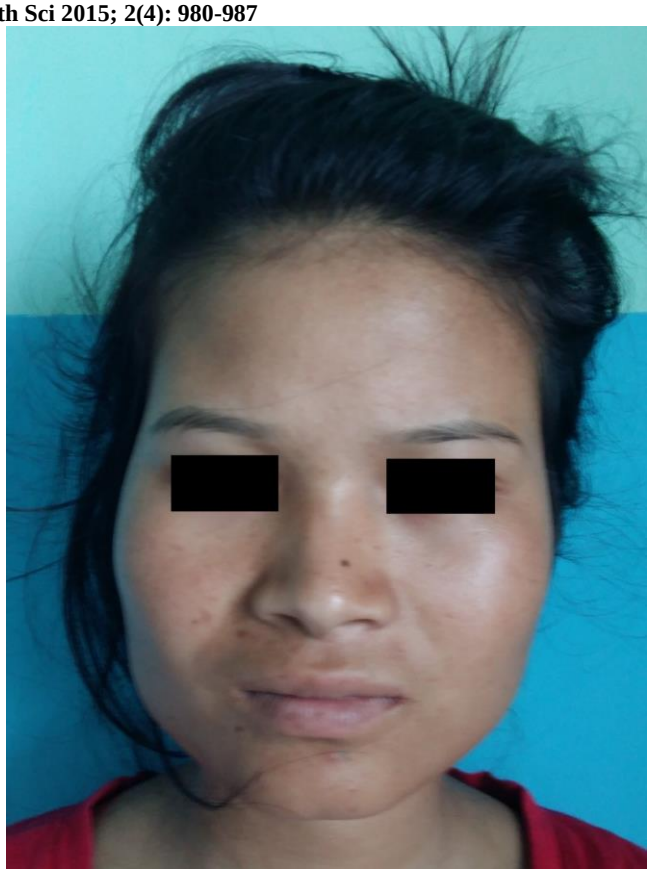

Figure 10: 6 months Post Operative view